

*(concise explanation)*

Japanese Patent Application Laid-Open No. 8-220199

The feature of the present invention is the following means for:

measuring operating signals (RUN/HALT/SLOW/OFF) of a CPU (central processing unit) by each timer corresponding to the above signals to obtain each accumulated time in respective modes;

calculating the products of the accumulated time multiplied by the consumption current, which is previously provided in a table, for each mode: and then

obtaining the accumulated electric power of the whole device to display the residual electric power quantity on a display device.

The invention in our application is characterized in that a processor mode is switched by request for detaching of batteries, and is independent of the present well-known example.

Japanese Patent Application Laid-Open No. 8-54967

The present invention is characterized in that loss of diodes is prevented by switching of a discharging and charging circuit for a secondary battery using an FET (field effect transistor), instead of a diode, and the above invention has a characteristic switching method of the above control FET. However, the invention in our application is characterized in that the processor mode is switched, when the electric power may not be supplied, according to a judgement whether there is

enough electric power for the device after detaching any of batteries in parallel discharging among a plurality of batteries in simultaneous discharging. Therefore, the above invention is independent of the present well-known example.

Japanese Patent Application Laid-Open No. **5-211728**

The present invention is characterized in, in a device having a plurality of batteries, that it has a unique switching method of a discharging circuit at detaching the above batteries; a reset signal is transmitted to the device, when the battery voltage is reduced lower than a threshold at switching; and a charging circuit is switched to an uncharged battery, when a battery under charging is detached.

The invention in our application is characterized in that a processor mode is switched, when the electric power is not supplied, according to judgement of whether the discharging voltage is reduced to a level at which the device may not work by increased discharging current of remained batteries in the device in the case where some of batteries in parallel discharging are detached among a plurality of batteries in simultaneous discharging. Therefore, the invention in our application is independent of the present well-known example.

Japanese Patent Application Laid-Open No. **10-12281**

Articles in our application related to permission/rejection of detaching of batteries in parallel discharging at simply simultaneous discharging without

switching of processor modes are eliminated, as some of articles of claims in our application contravene articles of the claims in the present invention.

Therefore, the invention in our application is amended so that it is characterized only in switching of the processor modes by detaching of batteries in parallel discharging.

# PATENT ABSTRACTS OF JAPAN

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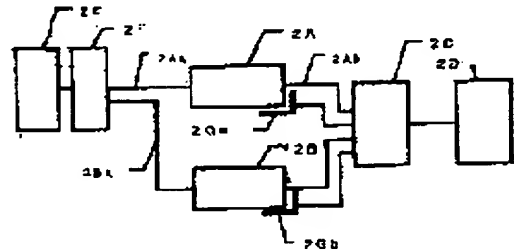
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 (22)Date of filing : 19.06.1996 (72)Inventor : TANABE HISASHI

## (54) A PLURALITY OF BATTERY CONTROL SYSTEMS

### (57)Abstract:

**PROBLEM TO BE SOLVED:** To avoid leveling down of a system and a loss of data during work, by supervising a residual amount of a plurality of batteries, in the case of the battery residual amount decreasing less than a reference when a battery is removed, locking this battery.

**SOLUTION:** When power supply is performed from a battery 2A, a battery information control device 2C acquires a residual amount of batteries 2A, 2B periodically from a battery information transmitting device 2D. Here, the battery 2A is removed, even only the rest of the battery 2B is decided for whether it leads or not to a fixed reference value. When the battery is less than the reference value, a lock signal is fed relating to a battery lock mechanism 2Ga. When the battery is more than the reference value, a lock release signal is fed. Also relating to the battery 2B, similar operation is performed.



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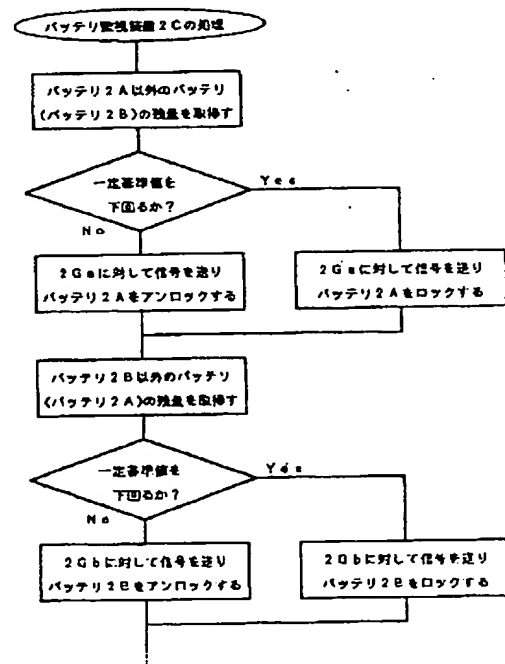
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(54) 【発明の名称】 複数バッテリー管理システム

(57) 【要約】

【課題】 複数のバッテリーを備えることが可能な携帯型パーソナルコンピュータ等において、一つのバッテリーを取り外されることによりバッテリー残量が基準値を下回り、システムダウンに陥ることがないようにする。

【解決手段】 複数のバッテリーと、各々のバッテリー残量を個別に管理する手段と、各々のバッテリーに対して外せないようにロックをかけられるロック手段とを有し、前記複数のバッテリーのうちのいずれかのバッテリーが外されると残りのバッテリー残量が一定の基準値を下回る場合は、そのバッテリーが外せないようにロックをかけるように複数バッテリー管理システムを構成する。



## 【特許請求の範囲】

【請求項1】複数のバッテリーと、各々のバッテリー残量を個別に管理する手段と、各々のバッテリーに対して外せないようにロックをかけられるロック手段とを有し、前記複数のバッテリーのうちのいずれかのバッテリーが外されると残りのバッテリー残量が一定の基準値を下回る場合は、そのバッテリーが外せないようにロックをかけることを特徴とする複数バッテリー管理システム。

## 【発明の詳細な説明】

## 【0001】

【発明の属する技術分野】本発明は、複数のバッテリーで駆動する携帯型パーソナルコンピュータ等の複数バッテリー管理システムに関する。

## 【0002】

【従来の技術】従来の携帯型パーソナルコンピュータにおいては、例えば特開平5-80892号公報や特開平6-338306号公報記載のように利用者がバッテリーを誤って取り外すことがないようにロック機構を設けている。

【0003】また、長時間の使用のために携帯型パーソナルコンピュータに複数のバッテリーを備えたものがある。このような携帯型パーソナルコンピュータの複数バッテリー管理システムでは、複数のバッテリーを交互に切り換えながら使用していくか、または現在使用中のバッテリー残量が一定の基準値を下回ると別のバッテリーに切り換えて使用するものであった。そして、各々のバッテリーの残量が一定の基準値を下回ったときにのみ警告を促すものであった。

## 【0004】

【発明が解決しようとする課題】しかし上記従来技術では、複数のバッテリーの合計の残量が一定の基準値を上回っているため、システム全体としては残量が足りている様に見える。そこでユーザはバッテリー交換する等の目的でバッテリーを外すことができしまい、それにより全体のバッテリー残量が基準値を下回ってしまい、システムがダウンして作業中のデータを損失してしまうという問題があった。

【0005】本発明の目的は、かかる従来技術の問題点を解決し、バッテリーを外せないようにしてシステムダウンを避けるような複数バッテリー管理システムを提供することにある。

## 【0006】

【課題を解決するための手段】上記目的を達成するために、本発明の複数バッテリー管理システムは、複数のバッテリーと、各々のバッテリー残量を個別に管理する手段と、各々のバッテリーに対して外せないようにロックをかけられるロック手段とを有し、前記複数のバッテリーのうちのいずれかのバッテリーが外されると残りのバッテリー残量が一定の基準値を下回る場合は、そのバッテリーが外せないようにロックをかけるように構成する。

【0007】上記構成により、複数あるバッテリーの残量を各々個別に監視し、バッテリーが外されたときに残りのバッテリー残量が基準値を下回る場合にそのバッテリーが外せないようにロックをかけるため、ユーザのバッテリー取り外しによるシステムダウンが避けられる。

## 【0008】

【発明の実施の形態】以下、本発明の実施例を図面を参照して詳細に説明する。

【0009】図1は、従来技術を用いた場合の携帯型パーソナルコンピュータにおける複数バッテリー管理システムの説明図である。2つのバッテリー1A、1Bはそれぞれ1Aa、1Baから電源制御装置1Eに給電される。またこれらバッテリーの選択は切り替えスイッチ1Fにより行われるもので、電源制御装置1Eまたはバッテリー情報伝達装置1D等からの信号により切り替え制御される。

【0010】バッテリー情報管理装置1Cは、任意の時点でバッテリー情報伝達装置1Dに対して命令を出して1Ab、1Bbを通して各バッテリー1A、1Bの残量、残時間等の情報を取得するものである。

【0011】またバッテリー情報伝達装置1Dは、独自にバッテリー情報を定期的に取得し、それが一定の基準値を下回った場合にバッテリー情報管理装置1Cにその情報を伝えることもある。それを受けたバッテリー情報管理装置1Cは、ブザーを鳴らしたり、画面に表示したり、オペレーティングシステムに通知する等の方法によりユーザに知らしめるものである。

【0012】図2は、本発明の一実施例に係る複数バッテリー制御システムの説明図である。従来技術同様、2つのバッテリー2A、2Bは切り替えスイッチ2Fにより選択されて、それぞれ2Aa、2Baから電源制御装置2Eに給電される。バッテリー情報伝達装置2Dは、任意の時点でバッテリー情報管理装置2Cからの命令を受けて2Ab、2Bbを通して各バッテリー2A、2Bから残量、残時間等の情報を取得して、バッテリー情報管理装置2Cにその情報を返す。そしてバッテリー情報伝達装置2Dは、バッテリー情報管理装置2Cから命令を受けて、本発明の特徴であるバッテリーロック機構2Ga、2Gbに対して個々にバッテリーのロックまたはロック解除の信号を送るものである。

【0013】ここで、システムはバッテリー2Aから電源供給を行っていると仮定する。バッテリー情報管理装置2Cはバッテリー2A、2Bの残量をバッテリー情報伝達装置2Dから定期的に取得する。そこで、バッテリー2Aが外されても残りのバッテリー2Bだけでも一定の基準値に達しているか判定し、もし下回っているならばバッテリーロック機構2Gaに対してロック信号を送り、基準値を上回っているならばロック解除信号を送る。バッテリー2Bに対しても同様に、外されても残りのバッテリー2Aだけでも一定の基準値に達しているか判定し、もし下回って

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いるならばバッテリーロック機構 2 G b に対してロック信号を送り、基準値を上回っているならばロック解除信号を送る。これらの制御流れ図を図 3 に示す。

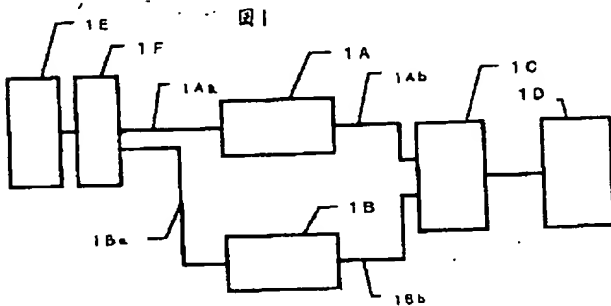
【0014】但し、システム稼働中にバッテリーを充電することができない場合は、一旦基準値を下回ったら再度基準値を上回ることではないため、ロック解除信号を送る必要はない。

【0015】またバッテリー情報伝達装置 2 D がバッテリー情報管理装置 2 C を介さずに、独自にバッテリー 2 A、2 B の情報を定期的に取り得して上述した、バッテリー外し時の残りバッテリー容量の判定を行って、バッテリーロック装置 2 G a、2 G b を制御することも可能である。

【0016】

【発明の効果】本発明によれば、複数あるバッテリーの残量を各々個別に監視し、バッテリーが外されたときに残りのバッテリー残量が基準値を下回る場合には、そのバッテリーが外せないようにロックをかけるため、ユーザのバッ

【図 1】



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テリー取り外しによるシステムダウンおよび作業中のデータの損失が避けられる。

【図面の簡単な説明】

【図 1】従来技術の複数バッテリー管理システム全体を示すブロック図である。

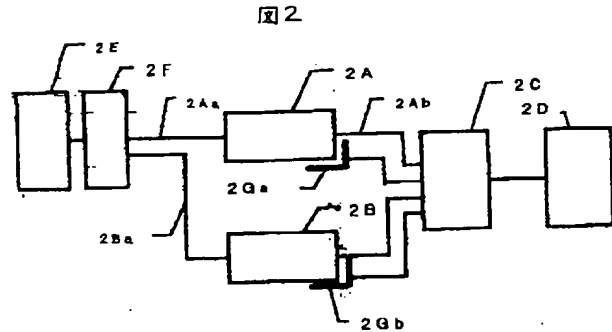
【図 2】本発明の一実施例の複数バッテリー管理システム全体を示すブロック図である。

【図 3】本発明の一実施例におけるバッテリー残量判定処理制御流れ図である。

【符号の説明】

1 A、1 B…バッテリー、1 C…バッテリー情報管理装置、1 D…バッテリー情報伝達装置、1 E…電源制御装置、1 F…切り替えスイッチ、2 A、2 B…バッテリー、2 C…バッテリー情報管理装置、2 D…バッテリー情報伝達装置、2 E…電源制御装置、2 F…切り替えスイッチ、2 G a、2 G b…バッテリーロック機構。

【図 2】



【図 3】

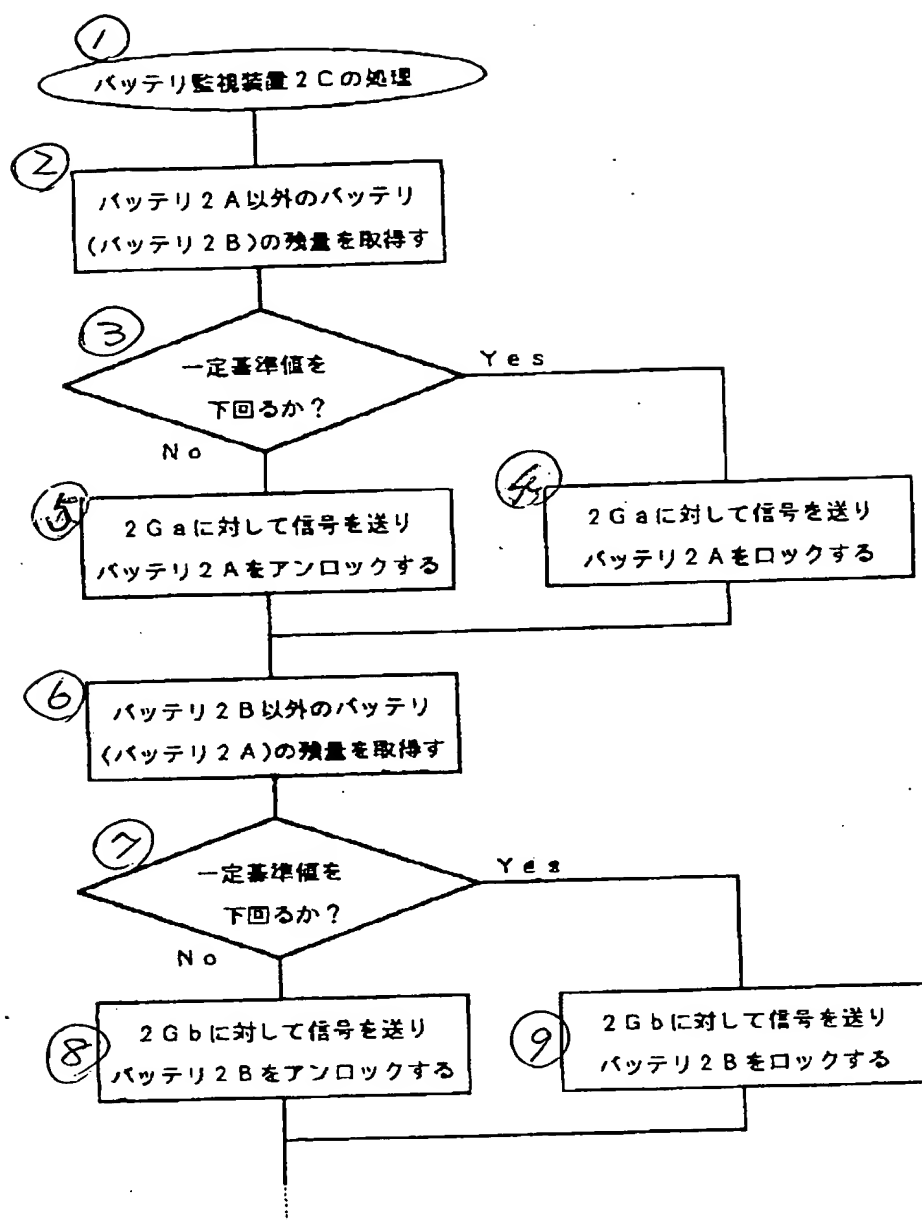


図 3



(1) 10-12281

[Title of the Invention]

CONTROL SYSTEM FOR A PLURALITY OF BATTERIES

[Abstract]

[Problem] The object is to prevent system down caused by an electric power quantity of remaining batteries under a standard level at detaching of a battery in a portable personal computer and the like with a plurality of batteries, and so on.

[Means for Solving the Problem] In order to realize the above object, the invention comprises: a plurality of batteries; a control means for individual control of residual electric quantity of each battery; and a locking means for putting each battery user lock and key against detaching. When any one of a plurality of the above batteries is detached, and an electric power quantity of remaining batteries is under a predetermined standard level, a control system for a plurality of batteries is configured to put a battery under lock and key against detaching.

[What is claimed is]

[Claim 1] A control system for a plurality of batteries comprising:

a plurality of batteries;

a control means for individual control of residual electric quantity of each battery; and

a locking means for putting each battery user lock and key against detaching, characterized in that

when any one of a plurality of the above batteries is

detached, and an electric power quantity of remaining batteries is under a predetermined standard level, a control system for a plurality of batteries is configured to put a battery under lock and key against detaching.

[Detailed Description of the Invention]

[0001]

[Field of the Invention] The present invention is related to a control system of a plurality of batteries of a portable personal computer driven by a plurality of batteries.

[0002]

[Prior Art] In a conventional portable personal computer, a locking mechanism has been installed in order to prevent a user from detaching of batteries by mistake, for example, as illustrated in Japanese Patent Application Laid-Open No. 5-80892, and Japanese Patent Application Laid-Open No. 6-338306.

[0003]

Moreover, there have been portable personal computers with a plurality of batteries for a long time use. In a control system of a plurality of batteries for such portable personal computers, a plurality of batteries have been used under alternately switching, or another batteries have been used by switching, when an electric power quantity of batteries under current use is under a predetermined standard level. And warning has been given only when an electric power quantity of batteries under current use is under a predetermined standard level.

[0004]

[Problems to be Solved by the Invention] However, in the above conventional technique, the residual quantity has been looked upon as enough for the whole system, as the total sum of the residual electric power quantity of a plurality of remaining batteries is over a predetermined standard level. Then, there has been a problem in which data under working are lost by system down, as a user has been able to detach a battery for exchange of batteries, and the residual electric power quantity of the whole system has been user the predetermined standard level.

[0005] The object of the present invention is to solve the above problem of the conventional technique, and to offer a control system of a plurality of batteries.

[0006]

[Means for Solving the Problem] In order to achieve the above object, a control system of a plurality of batteries of the present invention comprises: a plurality of batteries; a control means for individual control of residual electric power quantity of each battery; and a locking means for putting each battery user lock and key against detaching. When any one of a plurality of the above batteries is detached, and an electric power quantity of remaining batteries is under a predetermined standard level, the above control system is configured to put a battery under lock and key against detaching.

[0007] The above configuration may prevent system down caused by user detaching of batteries, as individual monitoring of residual electric power quantity of a plurality of batteries, and a battery is put under lock and key against detaching when

any one of a plurality of the batteries is detached, and an electric power quantity of remaining batteries is under a predetermined standard level.

[0008]

[Embodiment of the Invention] Hereinafter, an embodiment according to the present invention will be described in detail, referring to drawings.

[0009] FIG. 1 shows an explanatory view of a control system of a plurality of batteries in a portable personal computer, which is based on a conventional technique. The voltages of two batteries 1A, 1B are supplied to a power supply control device 1E through 1Aa and 1Ba, respectively. Moreover, selection of the above batteries is performed by a changeover switch 1F, and the switching control is performed according to a signal from the power supply control device 1E or a battery information transmission device 1D and the like.

[0010] A battery information management device 1C gives instructions to the battery information transmission device 1D at any time to obtain information such as residual electric power quantity, residual electric power time and the like of each battery 1A, 1B through 1Ab, 1Bb, respectively.

[0011] And, the battery information transmission device 1D independently obtains the battery information on regular basis, and sometimes sends the information to the battery information management device 1C, when it is under a predetermined standard level. The battery information management device 1C receiving the above information lets a user know through a method such

as sounding of a buzzer, display on a screen, and notification to the operating system.

[0012] FIG. 2 shows an explanatory view of the control system of a plurality of batteries according to one embodiment of the present invention. In a similar way to that of the conventional technique, the voltages of two batteries 2A, 2B are supplied to the power supply control device 2E, respectively, from 2Aa and 2Ba by selection through the changeover switch 2F. The battery information transmission device 2D receives the instructions from the battery information management device 2C at any time, and obtains the information such as residual electric power quantity, residual electric power time, and the like of each battery 2A, 2B through 2Ab, 2Bb, respectively to return the above information to the battery information management device 2C. Then, the battery information transmission device 2D receives the instructions from the battery information management device 2C to send a signal for putting a battery under lock and key, or for unlocking the locked battery, respectively to a battery locking mechanism 2Ga, 2Gb.

[0013] Here, it is assumed that the power supply is performed from the battery 2A in the system. The battery information management device 2C obtains information on residual electric power quantities of the battery 2A, 2B from the battery information transmission device 2D on regular basis. Then, it is judged whether the residual electric power quantity of only the battery 2B is equal to or over a predetermined standard level even if the battery 2A is detached; a signal for locking the

battery is sent to the battery locking mechanism 2Ga when under the level; and one for unlocking the battery is transmitted to there when not under the level. Similarly, it is judged whether the residual electric power quantity of only the battery 2A is equal to or over the predetermined standard level even if the battery 2B is detached; a signal for locking the battery is sent to the battery locking mechanism 2Gb when under the level; and one for unlocking the battery is transmitted to there, when not under the level. The above control flow is shown in FIG. 3.

[0014] However, when it is impossible to charge batteries during operation of the system, there is no need to send the unlocking signal, as there is no case where the voltage of the battery exceeds the standard level, once it becomes under the level.

[0015] Moreover, it is also possible to control the battery locking devices 2Ga, 2Gb by the above judgement of the residual electric power of the battery at detaching of the battery, after the battery information transmission device 2D independently obtains the information on the batteries 2A, 2B, not through the battery information management device 2C.

[0016]

[Effect of the Invention] The present invention may prevent system down caused by user detaching of batteries, and loss of data under working, as individual monitoring of residual electric power quantity of a plurality of batteries, and a battery is put under lock and key against detaching when a battery is detached, and an electric power quantity of remaining

batteries is under a predetermined standard level.

[Brief Description of the Drawings]

FIG. 1 shows a block diagram of the whole system of a control system of a plurality of batteries according to the conventional technique.

FIG. 2 shows a block diagram of the whole system of a control system of a plurality of batteries according to one embodiment of the present invention.

FIG. 3 shows a flow chart for judgement operation of residual electric power quantity of a battery according to one embodiment of the present invention.

[Description of Reference Numerals]

1A, 1B ... Battery

1C ... Battery information management device

1D ... Battery information transmission device

1E ... Power supply control device

1F ... Changeover switch

2A, 2B ... Battery

2C ... Battery information management device

2D ... Battery information transmission device

2E ... Power supply control device

2F ... Changeover switch

2Ga, 2Gb ... Battery locking mechanism

FIG. 3

- ① Operation of a battery monitoring device 2C
- ② Obtaining of information on residual electric power quantity
- ③ of a battery (battery 2B) other than a battery 2A
- ④ Under a predetermined standard level?
- ⑤ (Yes) Locking of the battery 2A after sending a signal to 2Ga
- ⑥ (No) Unlocking of the battery 2A after sending a signal to 2Ga
- ⑦ Obtaining of information on residual electric power quantity  
of a battery (battery 2A) other than a battery 2B
- ⑧ Under a predetermined standard level?
- ⑨ (No) Unlocking of the battery 2B after sending a signal to 2Gb
- ⑩ (Yes) Locking of the battery 2B after sending a signal to 2Gb



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